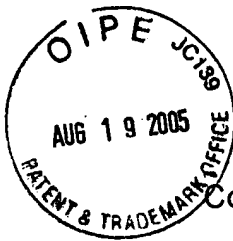


Bereskin & Parr

INTELLECTUAL PROPERTY LAW

Appl. No. : 09/916,247
Applicant : COTE et al.
Filed : July 30, 2001
Title : CHEMICAL CLEANING BACKWASH FOR NORMALLY
IMMERSED MEMBRANES
TC./A.U. : 1723
Examiner : MENON, Krishnan S.

Docket No. : 4320-347
Customer No. : 001059



Confirmation No.: 9131

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
P. O. Box 1450
Alexandria, Virginia 22313-1450

August 18, 2005

BRIEF IN SUPPORT OF APPEAL

Real Party in Interest

The Real Party in Interest in the present Appeal is Zenon Environmental Inc., the assignee, as evidenced by the assignment set forth at Reel 014916, Frame 0650.

Related Appeals and Interferences

Application Serial No. 09/425,234 is the parent of this application. Application Serial No. 10/461,687 is a continuation of Application Serial No. 09/425,234. Appeals are pending in both of those applications and may directly affect or have a bearing on the Board's decision in this appeal. Both of the related applications mentioned above are owned by Zenon Environmental Inc.

There are no related interferences.

08/22/2005 JADD01 00000008 09916247
02 FC:1402 500.00 OP

Status of the Claims

Claims 1-25 have been cancelled. Claims 26-36 are pending and the subject of this appeal.

Status of Amendments

No amendments have been filed after the Final Rejection of January 7, 2005.

08/22/2005 JADD01 00000007 09916247

02 FC:1401 500.00 OP

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TORONTO MISSISSAUGA WATERLOO MONTREAL

Summary of the Claimed Subject Matter

The Applicant's invention relates to a process for filtering water containing solids with membranes in a tank (page 5, line 19 to page 6, line 9; "liquid feed 14" or "tank water 22", "membranes 24" and "tank 20" shown in Figure 1).

The basic process involves five steps, (a) filling the tank with feed water to immerse the membranes (page 6, lines 1-2); (b) generating a filtered permeate at a permeate outlet and a retentate in the tank (page 7, line 9 to page 8, line 12; "permeate 36", "permeate outlet 38", "retentate 46" shown in Figure 1); (c) aerating the membranes to dislodge solids from the membranes (page 8, lines 13-22); (d) backwashing the membranes (page 8, line 23 to page 9, line 6); and, (e) draining the tank of the retentate (page 7, lines 26-29; page 8, lines 2-6).

These steps, (a) through (e), are performed in a repeated cycle. However, an additional step (f) of wetting the membranes with a cleaning chemical is performed in some or all of the cycles. Step (f) is performed at least once a week after or while draining the tank in a first cycle and without returning to permeation before starting a subsequent cycle (page 9, lines 19-24; page 18, line 21 to page 19 line 3). Because step (f) occurs within a cycle and at least once a week, a cycle, that is steps (a) through (e), also occurs at least once a week. Accordingly, a step of draining the tank of retentate (step (e)) occurs at least once a week.

Claim 28 modifies claim 26 in two ways. Firstly, claim 28 introduces a new step of performing recovery cleanings to increase the permeability of the membranes. Secondly, claim 28 states that the steps of claim 26 are performed between the recovery cleanings to reduce the rate of a decline in permeability of the membranes between the recovery cleanings. These aspects of the invention are discussed, for example, at page 17, line 21 to page 18, line 5. As discussed therein, the concentration and duration of the chemical wetting (step (f)) of claim 26 may be chosen such that the permeability of the membranes continues to decline over an extended period of time even in the presence of the chemical wetting step, but the rate of this decline is reduced. A recovery cleaning is performed at the end of such a period of time to restore

the permeability of the membranes. Accordingly, the cleanings of step (f), integrated into a filtration cycle as described in claim 26, are insufficient on their own to preserve permeability of the membranes over their service life (which is hopefully many years), but reduce the frequency at which recovery cleanings would otherwise be required (page 9, lines 7-17).

The other claims further define the invention of claims 26 or 28. Claim 27 shortens the frequency of the filtration cycles, including steps of draining retentate and wetting the membranes with a cleaning chemical, to one day or less (page 18, line 27 to page 19, line 3). Claims 29 and 30 describe the concentration of the cleaning chemical and duration of the wetting of step (b) of claim 26 (page 16, line 28 to page 17, line 20; page 18 lines 6-20). Claim 31 describes the frequency of the recovery cleanings of claim 28 (page 17, line 27). Claim 32 indicates that the process is used for producing drinking water and defines the class of cleaning chemical (page 9, lines 26-28; page 18, lines 6-9). Claim 33 states that the cleanings of step (f) of claim 26 are performed regularly and at about the same effectiveness (page 18, lines 19-20). Claim 34 states that the membranes are backwashed with permeate after being wetted with the cleaning chemical but before starting a new cycle, the effect of which is to rinse the permeate side of the membranes before withdrawing more permeate in the next cycle (page 10, lines 9-11). Claim 35 defines a method of delivering chemicals to the membranes, namely mixing a cleaning chemical into water flowing to the permeate side of the membranes (page 16, lines 12-16). Claim 36 describes hollow fiber membranes (page 6, line 24 to page 7, line 4; "membranes 24" as shown in Figures 1-4).

Grounds of Rejection to be Reviewed on Appeal

Claims 26-36 were rejected as being anticipated by Smith et al US Patent No. 5,403,479 (Smith '479). Claims 26-30, in an earlier form and before claims 31-36 were added, were previously rejected as being obvious in view of Smith et al. in an Office Action mailed May 16, 2003. This rejection was traversed by Applicants in a response filed July 16, 2003 in which the Applicants submitted that Smith teaches away from draining the tank. In the following Office Action of October 22,

2003, the obviousness rejection was not repeated and claim 26 was instead rejected for anticipation. On page 6 of that Office Action, the Examiner stated that, "the argument whether the Smith reference makes draining the tank obvious or not is addressed by changing the rejection of the claims". No rejections for obviousness were made in any subsequent Office Action. Accordingly, the Applicants understand that the rejection of claims 26-36 is purely on the basis of anticipation.

The Examiner's Rationale

The Examiner accepts that Smith et al. at least do not advocate draining a tank. However, the Examiner notes that Smith discusses a prior art process in which a tank is drained. The Examiner's argument, as the Appellants understand it, is that Smith '479 discusses all of the steps of claim 26, some in relation to a prior art process, and some in relation to Smith et al.'s process and so Smith '479 anticipates claim 26. The Examiner further alleges that all of the additional elements of the dependant claims are found in Smith '479, again either in relation to prior art processes or in relation to Smith et al.'s process, and so these claims are also anticipated.

ARGUMENT

I. The Section 102 Rejection of Claims 26-36

The Appellants submit, in brief, that the Examiner's rejection is improper for two reasons. The first reason is that anticipation requires disclosure of all of the claimed elements in combination as claimed. The Examiner has improperly selected and combined elements from multiple distinct processes. The second reason is that many of the Examiner's cited references fail to disclose the claim elements that they are alleged to disclose.

Claim 26

The Examiner states, "Smith discusses about draining the tank during cleaning as in claim 26, but does not advocate draining the tank during the cleaning

process as in claim 26 (col 10 lines 64-68, col 11 lines 22-30). However, a reference is no less anticipatory if, after disclosing the invention, the reference then disparages it." The Applicants primary submission is that the Examiner, in citing columns 10 and 11 of Smith '479, is improperly mixing elements of a prior art process described at column 10 and one of the Smith processes described at column 11 to find the elements of the Applicants' claims. Such a selection of elements from two entirely distinct processes does not support a valid rejection for anticipation. None of the processes disclosed in Smith are the same as the claimed invention, so there is no anticipation.

The Examiner's first reference (col 10, lines 64-68) is drawn from the Background of the Invention section of Smith '479 and is part of a discussion of prior art methods, not the method of Smith's invention. The entire paragraph that this reference is drawn from is repeated below:

An obvious drawback of cleaning from the outside of a tube or fiber, rather than from the inside, is that to do so requires a shell. If there is no shell, as in a frameless array such as one disclosed in the '524 array must be removed from the process reservoir in which it operates and immersed in a cleaning solution in another tank. An alternative is to drain the process reservoir and to substitute cleaning solution; then drain the cleaning solution after cleaning, and refill the reservoir. As is evident, this is a highly undesirable alternative.

This entire passage relates to prior art methods involving "cleaning from the outside of a tube or fiber". The need to drain a tank or retentate follows from the need to re-fill the tank with a cleaning solution to apply a cleaning solution to the outside of the membranes. In contrast, Smith advocates, and describes as his invention, a method involving cleaning fibers from their lumens, or insides, without draining a tank.

The Examiner's next reference (col 11, lines 22-30) is the beginning of the Summary of Invention of Smith '479 and is repeated below:

Highly effective cleaning of a module containing an UF or a MF membrane having a fouled surface is obtained during an unexpectedly short period, without draining feed (substrate) from the module, by introducing a chosen cleaning fluid into the permeate and recycling it through the lumens at low pressure in the range from about atmospheric but no more than the bubble-point of the fiber. The method comprises maintaining a selected low pressure no more than the bubble-point...

Thus the method of Smith et al.'s invention differs in at least two ways from the prior art method discussed at column 10, lines 64-68. Firstly, the Smith invention involves applying a cleaning solution to the insides of the membranes. Secondly, Smith's process is performed without draining the tank.

The Appellant submits that these references do not support the Examiner's contention that "Smith discusses about draining the tank during cleaning as in claim 26". Instead, Smith discusses draining the tank only in relation to a prior art process. However, there is no disclosure in relation to that prior art process of all of the elements of claim 26, or even draining the tank at least once a week. Smith then discusses the process of his invention which is not the same as the prior art process and which explicitly does not involve any step of draining a tank. Reading these passages together does not provide a discussion of a process according to claim 26 but rather of two distinct processes, neither of which has the elements of claim 26.

The Examiner cites the *Celeritas* and *In re Susi* cases for the proposition that an anticipatory reference may, after disclosing the invention, teach away from it. However, neither case contradicts the basic requirement that a reference, to anticipate, must disclose all of the claimed elements identically as claimed and

arranged as in the claim. *In re Bond* 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990), page 832, right hand column, Section II, first paragraph. Smith '479 fails to disclose all elements of the claims, combined and arranged as described in the claims.

The Applicants further submit that the Examiner's other references also fail to disclose what the Examiner alleges of them. For example, the Examiner alleges that Figure 4 of Smith discloses wetting the membranes at least once a week with a cleaning fluid. However, in Figure 4, data points (2), (3) and (4) relate to simple backwashes with water only and there is about a 9 day gap between data points (1) and (5). Accordingly, this allegation is incorrect. Further, the process of Figure 4 does not describe a process in which the tank is drained as part of a repeated cycle and so does not disclose wetting the membranes in a manner that meets all of the requirements of part (f) of claim 26.

The Applicants submit that the dependent claims are all allowable for at least the reasons given in relation to their parent claim 26. However, additional reasons why the dependent claims are allowable are given below.

Claim 27

Claim 27 requires, among other things, that the cycle of step (i) of claim 26, which includes a step of draining the tank of the retentate, be repeated at least once a day. The reference cited by the Examiner does not discuss draining a tank at all, much less at least once a day.

Claim 28

Claim 28 requires a step of performing recovery cleanings to increase the permeability of the membranes and states that the cleaning events of claim 26 are performed between the recovery cleanings to reduce the rate of a decline in the permeability of the membranes. Both steps, the recovery cleanings and the cleaning events, are performed in the same process yet the Examiner again selects elements of two separate processes, the prior art process of column 10,

lines 64-68 and Smith et al's process of column 11, lines 22-30, or column 13, lines 50-57. Further, none of these citations describes cleaning steps that reduce a rate of decline in permeability.

Claims 29 and 30

Regarding claims 29 and 30, none of the Examiner's references describe a weekly CT value (sum of the products of chemical concentration and duration of contact with the membranes for all steps of wetting the membranes with cleaning chemicals conducted in a week). The reference at col 11, lines 30-55 of Smith '479 describes a maximum duration of a cleaning event. The references to the table and col 15 lines 34-36 give sample concentrations without suggesting an appropriate duration to be used with such a concentration. None of these references discuss how many cleanings of any particular duration or concentration would be done in a week. Finally, the Examiner cites col 1, lines 18-22 to say that the process in Smith is on-going, but this reference, besides not defining a weekly CT, also does not relate to the process in Smith '479, but to a prior art process having "inside-out" flow. Smith et al state in the following col 1, lines 23-25 that their invention relates, in contrast, to "outside-in" flow.

Claim 31

Regarding claim 31, which describes recovery cleanings at least 1 month apart from each other, the Examiner refers to Figure 4. However, Figure 4 describes an experiment lasting only about 16 days. The Examiner again cites col. 1, lines 18-22 but this passage only makes a vague reference to membranes being "periodically cleaned" and, as discussed above, does not relate to the process of the Smith '479 invention but to a prior art process having "inside-out" flow. The Examiner then asserts that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. However, claim 31 depends on claim 28 which, for the reasons given above, is not a known process and the time between recovery cleanings is not the optimum value of a

result effective variable. Further, the doctrine cited by the Examiner relates to alleged obviousness, not anticipation.

Claim 32

Claim 32 specifies that the permeate is intended for use as drinking water and that the cleaning chemical comprises an oxidant. The Examiner asserts that Smith '479 discusses purifying ground water which could be a source of drinking water. However, the Examiner fails to provide prima facie evidence that Smith '479 teaches that the cleaning chemical is an oxidant in this case. The Examiner then cites a portion of the reasons in *Ex parte Masham*, but the cited portion relates to apparatus claims whereas claim 32 is a process claim.

Claim 33

Regarding claim 33, the Examiner has not provided prima facie evidence that Smith discloses a process as in claim 26, with a weekly CT in the range specified in claim 29 wherein the steps of part (f) of claim 26 are performed at regular intervals and each have about the same product of concentration and duration. The Examiner merely references the "abstract and figures of Smith" which does not disclose a combination having all of the elements of the claims.

Claims 34

Claim 34 states that the membranes are backwashed with permeate after being wetted with a cleaning chemical and before starting a new cycle. The Examiner's reference to col 12, lines 26-68 simply fails to provide the elements of this claim.

Claims 35

Claim 35 recites, among other things, steps of flowing water to the permeate side of the membranes and mixing a cleaning chemical into the flowing water. The Examiner asserts that Smith '479 teaches mixing a chemical in a tank and then flowing it to the membranes. However, such a process in Smith '479 is not

equivalent to, and does not disclose the steps of, mixing a cleaning chemical into water flowing to the membranes.

Claim 36

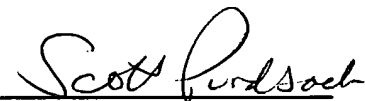
Claim 36 recites the use of hollow fiber membranes in the method of claim 26. The Appellants acknowledge that Smith '479 discusses hollow fiber membranes, but not as used in a process according to claim 26 on which claim 36 depends.

Summary

For the foregoing reasons, the Appellants believe that the Examiner's rejections of claims 26-36 were erroneous and reversal of his decision is respectfully requested.

Respectfully submitted,

BERESKIN & PARR

By 
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CLAIMS APPENDIX

26. A process for filtering water containing solids with membranes in a tank comprising the steps of:

a) filling the tank with a feed water to be filtered to immerse the membranes;

b) creating a transmembrane pressure between a permeate side and a retentate side of the membranes, the retentate side of the membranes being in contact with the water in the tank at ambient pressure, the permeate side being subject to a negative pressure relative to the pressure of the water in the tank fluidly connected to a filtered permeate outlet, to generate a filtered permeate at the permeate outlet and a retentate in the tank;

c) aerating the membranes to dislodge solids from the membranes;

d) backwashing the membranes; and,

e) draining the tank of the retentate;

wherein

i) the steps above are performed in repeated cycles; and,

ii) the steps of backwashing the membranes and draining the tank in a cycle may be performed either before the other or partially or substantially simultaneously; and,

f) wetting the membranes at least once per week with a cleaning chemical having a selected concentration for a selected duration after performing step (b) in a first cycle and after or while performing step (e) in the first cycle, without returning to step (b) in the first cycle and before starting a subsequent cycle.

27. The process of claim 26 wherein the repeated cycles of part (i) of claim 26 are repeated at least once a day and step (f) is repeated between once a day and once per cycle of part (i) of claim 26.

28. The process of claim 26 further comprising the steps of performing recovery cleanings from time to time to increase the permeability of the membranes wherein the steps of claim 26 are performed between the recovery cleanings and reduce the rate of a decline in permeability of the membranes between the recovery cleanings.

29. The process of claim 26 wherein the sum of the products of the selected concentration and selected duration of part (f) of claim 26 is between 2,000 min•mg/l and 20,000 min•mg/l per week over a period of at least 1 month when NaOCl is the cleaning chemical or an equivalent product of concentration and time of another cleaning chemical.

30. The process of claim 29 wherein the sum of the products of the selected concentration and selected duration of part (f) of claim 26 is between 5,000 min•mg/l and 10,000 min•mg/l per week over a period of at least one month when NaOCl is the cleaning chemical or an equivalent product of concentration and time of another cleaning chemical.

31. The process of claim 28 wherein the recovery cleanings are performed at least 1 month apart from each other.

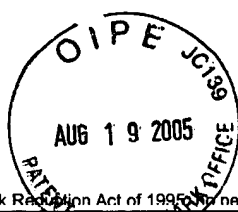
32. The process of claim 28 wherein the filtered permeate generated at the permeate outlet is intended for use as drinking water and the cleaning chemical comprises an oxidant.

33. The method of claim 29 wherein the steps of part (f) of claim 26 are performed at regular intervals and each have about the same product of selected concentration and selected duration.

34. The method of claim 26 wherein the membranes are backwashed with permeate in the first cycle after step (f) of claim 26 in the first cycle and before starting the subsequent cycle.

35. The method of claim 26 wherein step (f) of claim 26 further comprises the steps of flowing water to the permeate side of the membranes and mixing a cleaning chemical into the flowing water.

36. The method of claim 26 wherein the membranes are hollow fibre porous membranes.



PTO/SB/17 (12-04)

Approved for use through 07/31/2006. OMB 0651-0032

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL

For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500.00

Complete if Known

Application Number	09/916,247
Filing Date	July 30, 2001
First Named Inventor	COTE
Examiner Name	MENON, Krishnan S.
Art Unit	1723
Attorney Docket No.	4320-347

METHOD OF PAYMENT (check all that apply)☒ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____☐ Deposit Account Deposit Account Number: **022095** Deposit Account Name: **Bereskin & Parr**

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

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Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims	Fee (\$)	Fee Paid (\$)
- 20 or HP = 0	x		0.00			
HP = highest number of total claims paid for, if greater than 20						
Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)			
- 3 or HP = 0	x		0.00			
HP = highest number of independent claims paid for, if greater than 3						

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
- 100 = 0	/ 50 = 0	(round up to a whole number) x		0

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other: Filing a brief in support of an appeal (37 CFR 41.20(b)(2))

Fees Paid (\$)

500.00

SUBMITTED BY

Signature	<i>Scott Pundsack</i>	Registration No. 47,330 (Attorney/Agent)	Telephone (416) 364-7311
Name (Print/Type)	Scott Pundsack		Date August 18, 2005

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